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ABSTRACT

A study investigated the hypothesis that high frequency words can be effectively specified when word shape data are combined with available contextual clues. To test this hypothesis, an augmented contextual restriction task similar to one used by R. N. and L. R. Haber was employed. The task differed in terms of increased passage difficulty and the provision of length alternatives. Subjects, 20 college students, rated the appropriateness of each alternative word choice for each of 46 items. They were told to circle all of the words from the total list of alternatives that could be used to construct a reasonable sentence in English, then to underline the single word that they felt had been actually used in the reading passage. Results showed that while word shape exerted significantly more constraint than word length, word length still contributed markedly to high frequency word specification. (Excerpts from the restriction task are appended. (Author/FL)

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The Specification of High Frequency Words as a Function of Word Shape and Contextual Restriction

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Abstract

This investigation examined the notion that high frequency words can be effectively specified when word shape data is combined with available contextual information. To test this hypothesis, an augmented contextual restriction task similar to the Haber and Haber (1981) format was used. The present task differed in terms of increased passage difficulty and the provision of length alternatives. Twenty college-level readers rated the appropriateness of shape and length alternatives for each of 46 high frequency items in context. While word shape was found to exert significantly more constraint than word length, descriptive analyses indicated that word length still contributed markedly to high frequency word specification. Overall, the study served to replicate and extend earlier findings and demonstrated the need for additional inquiry.

The Specification of High Frequency Words as a Function of Word Shape and Contextual Restriction

Haber and Haber (1981) have argued that the identification of high frequency words in English may be facilitated when word shape data is integrated with a contextual knowledge of the passage being read. To test this "word-shape" hypothesis, eighteen adult readers were asked to engage in a contextual restriction task made over a second grade basal reader story. Based mainly on the results of this analysis (in combination with additional theoretical and empirical support) the authors concluded that word shape information can more often than not reduce the total number of high frequency word alternatives which might occur in any well-formed sentence.

The present study was essentially a replication of Haber and Haber's (1981) contextual restriction task with two noteworthy exceptions. First, the difficulty of the reading passage was substantially increased. This modification was introduced to make the target text more nearly like the type of materials that adult readers might normally expect to encounter. It is, after all, conceivable that mature readers might react differently to more challenging materials than they would to those written at a second grade level of difficulty. A more appropriate match would be between mature readers and advanced text. The significance of this match pertains not only to overall passage readability but also to related factors such

as the appeal of the discourse, the reader's purpose, familiarity of topic and text organization, reading rate, eye movement behavior, and other cognitive and affective dimensions of mental set (Groff, 1975, 1981; Just & Carpenter, 1980; Samuels, 1982).

The second modification of the contextual restriction task was that length alternatives were provided in addition to shape alternatives. While Haber and Haber acknowledged word length as a likely cue in word perception, they did not fully examine the contribution that this visual attribute makes to high frequency word specification in their contextual restriction format. Since the length of a word is an integral feature of word shape, the impact of word length might have been masked by the omission of appropriate length alternatives. It is entirely possible that the combination of contextual and word length data alone (without consideration of shape) accounts for much of the variability in normal reading.

The present study was designed to determine if rater effects similar to the Haber and Haber contextual restriction task would be achieved when both the difficulty of the discourse and the number of competing length distractors was markedly increased.

Method

Subjects

A total of 20 adult readers were selected for inclusion in the study. Participants were drawn from a pool of graduate students enrolled in various education courses at a major mid-Atlantic university.

Materials

A 325-word reading passage was selected for use in the study. The passage was taken from the Graduate Record Examination Aptitude Test (Turner, 1960). Its content dealt with parent-teacher conferences, a topic assumedly familiar to each of the subjects. According to the Fry (1977) formula, the difficulty of the passage was placed at the 15th grade level. In an earlier study using the same passage and similar subjects, it was established that the mean percentage of correct cloze test responses (43.3) fell within the instructional range as defined by Bormuth (1967) and Rankin and Culhane (1969).

In order to determine which high frequency words would serve as target items, all words in the passage appearing on the Kucera and Francis (1967) list were identified. Using a table of random numbers, a total of 46 high frequency words were chosen. The item sample consisted of 23 different "Kucera and Francis" words accounting for 18 distinctive word configurations. The words chosen for deletion, their frequency of occurrence in the passage, and their corresponding shapes are depicted in Figure 1.

Insert Figure 1 about here.

The reading passage was divided into 46 segments and placed on cards. The divisions were made immediately after the point that each selected high frequency word occurred. The high frequency word itself was

replaced with a standard-length blank space and followed by a series of word choices. The alternative choices included all of the words on the Kucera and Francis list which maintained the shape of the deleted word. In addition, all of the words from the list that possessed the exact same number of letters (word length) as the deleted words were included in the set of alternatives. An excerpt from the contextual restriction task appears in Figure 2.

Insert Figure 2 about here.

Procedure

Using the augmented contextual restriction format, the 20 subjects rated the appropriateness of each alternative word choice for each of the 46 items. They were directed to circle all of the words from the total set of alternatives (both shape and length) that could be used to construct a reasonable sentence in English. Lastly, they were asked to underline the single word that they felt had been actually used in the passage. Subjects were told to proceed through the cards one at a time. They were permitted to refer to completed cards but were asked not to look ahead. In this way, each of the decisions about the appropriateness of an alternative high frequency word was based strictly on the context that preceded it. Since the task required considerable deliberation, no time limit was imposed. The ratings were tabulated by counting only those shape and length alternatives circled by at least 80% of the raters as

contextually acceptable. The independent variable under investigation was level of visual constraint (word shape versus word length). Variability was examined across all items rather than between or within subjects. It should be noted that beyond the increased difficulty of the passage and the inclusion of length alternatives, the procedures were identical to the Haber and Haber (1981) contextual restriction task.

Results

An examination of the data reveals that the total set of both word shape and word length alternatives could be markedly reduced when restricted by context. By invoking the 80% inter-rater contextual criterion, it was found that for 43 of the 46 items only one permissible high frequency alternative existed when word shape data were considered. While this 93% specification ratio for word shape is certainly impressive, it should be noted that 30 of the items (65% of the total number) were equivalently constrained by word length information alone. Another way of interpreting the data is that a 28% gain in word specification was realized by the addition of word shape constraints. It might also be said that fully 70% of the items specifiable by the combination of shape and context were also specifiable by the combination of length and context.

Means and standard deviations were computed for word shape and word length constraints across all items. This data is reported in Table 1. An examination of this table indicates that both the mean and standard

deviation for word length constraints exceeded those generated for word shape. To determine the effect of level of visual constraint (word shape versus word length), a correlated samples t-test was calculated. Results of this analysis indicated a significant effect, $t(45) = 3.23$, $p < .01$.

Insert Table 1 about here.

A visual inspection of the data across items indicated the occurrence of an interesting pattern. As the items approached the halfway point, the effects for word shape and word length appeared to be virtually indistinguishable. To test this notion, an additional correlated samples t-test was computed in which only items 24 through 46 were considered. Results of this analysis indicated that word shape and word length constraints did not differ significantly over the final half of the passage, $t(22) = 1.0$, $p > .05$.

When the raters were asked to select the single word they thought had appeared in the story, they were unanimously agreed on 13 of the 46 words, picking the correct alternative in each case. This 28% rate of agreement was considerably less than the 95% rate reported by Haber and Haber. The disparity can most likely be linked to the fact that the inclusion of length alternatives increased the mean number of distractors from 3.56 to 41.9. Despite the substantial increase in alternative choices, the raters identified the original text word 68% of the time on the average.

Discussion

In the present study, the findings of the Haber and Haber (1981) contextual restriction task were replicated and extended. Word shape information, when combined with contextual constraints, appeared to facilitate the specification of high frequency words as measured in this study. For 93% of the items, only one alternative was permissible when word shape data was further restricted by context. In addition, it was found that word shape exerted a significantly greater specification effect than did word length. Of course, this latter trend may be due in part to the fact that there were substantially more length alternatives per item than shape alternatives.

In a related vein, there is ample reason to suspect that word length information may have accounted for a considerable proportion of the constraining effect of word shape. From an operational standpoint, shape data necessarily provides information about the length of a word. This is probably why 70% of the items specified by shape could also be specified by length alone. Interestingly, any "advantage" enjoyed by word shape in identifying high frequency words was negligible by the time that the mid-way point of the passage had been reached. Only one of the remaining 23 items could not be specified by word length alone. This data trend may be a result of a cumulative context effect as discussed by Aulls (cited in Shanahan, Kamil, & Tobin, 1982). According to this viewpoint, a general reduction of uncertainty might occur as a reader progresses

through a passage. In the contextual restriction task, it is conceivable that high frequency words could be specified in the latter half of the passage without regard to visual constraints of any kind because of the over-riding influence of context.

In summary, the results of this study should not be generalized beyond the nature and scope of the augmented contextual restriction format. Since the task required extensive deliberation, no direct inferences can be made regarding the operation of shape and length constraints in normal reading. Still, the study does serve to refine certain assumptions underlying the original Word-Shape position and indicate that further assessment of the contribution of visual information to word specification is warranted.

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Table 1

Means and Standard Deviations for

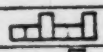
Two Levels of Visual Constraint.

Condition	$\bar{X}$	SD
Word Shape Constraint	1.1	0.35
Word Length Constraint	2.0	1.87

Figure Captions

Figure 1. Summary of descriptive data concerning the reading passage.

Figure 2. Selected excerpts from the augmented contextual restriction task.

WORD	SHAPE	NUMBER OF OCCURRENCES IN STORY	TOTAL NUMBER OF WORDS SHARING SHAPE	TOTAL NUMBER OF WORDS SHARING LENGTH
the		13	1	46
to		3	4	23
he		1	4	23
of		5	4	23
and		3	3	46
with		2	3	67
will		1	3	67
or		2	11	23
on		1	11	23
that		2	1	67
his		1	10	46
have		1	11	67
home		1	11	67
other		1	2	34
after		1	2	34
school		1	1	16
great		1	1	34
about		1	2	34
also		1	2	67
many		1	3	67
work		1	9	67
are		1	13	46
a		1	1	2

TOTALS			MEANS AVERAGED ACROSS FREQUENCY OF OCCURRENCE	
23	18	46	3.56	41.3

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Too often, however, teachers' conferences with parents _____

was	few	are	may	the	she	one	put
too	get	new	now	who	and	its	two
off	you	our	day	old	her	use	far
any	did	way	how	yet	own	man	see
got	war	men	can	say	out	had	not
but	has	him	for	his	all		

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Too often, however, teachers' conferences with parents are devoted _____

of	in	do	is	so	as	on	he
or	my	go	me	be	it	we	no
at	by	to	up	an	if	us	